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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/336,687	06/21/1999	KEN'ETSU YOKOGAWA	500.37328X00	7949

20457 7590 03/27/2003

ANTONELLI TERRY STOUT AND KRAUS
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EXAMINER

ALEJANDRO MULERO, LUZ L

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 03/27/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/336,687

Applicant(s)

YOKOGAWA ET AL.

Examiner

Luz L. Alejandro

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-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 January 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12, 14-34 and 36-66 is/are pending in the application.
- 4a) Of the above claim(s) 30, 37-49 and 54 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12, 14-29, 31-34, 36, 50-53 and 55-66 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-8, 10-12, 14, 17-19, 21-29, 31-34, 36, 50-53, 55, and 58-65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yokogawa et al., JP 9-321031 (machine translation) in view of Collins et al., U.S. Patent 6,068,784 and further in view of Toshihisa et al., JP 07-310187, Collins et al., U.S. Patent 6,054,013, or Collins et al., U.S. Patent 6,074,512.

Yokogawa et al. shows the invention substantially as claimed including a plasma processing system for use with a surface processing apparatus in which a vacuum chamber 101 includes a vacuum generating means (see figure 1 and paragraph 0017); source material gas supply means 116 having the claimed characteristics of claim 12; sample setting means 111; high-frequency power applying means; the source material is transformed into plasma to achieve surface processing of the sample 110; means for generating the plasma including electromagnetic wave supply means 104; magnetic field generating means 102; means 112 for making radicals incident to a surface of the sample; and means for reducing variation in time of the radicals incident to the sample; wherein the apparatus introduces electromagnetic field from a planar plate 107, the planar plate being disposed in parallel with the sample into the vacuum chamber (see figure 1), and is set to be separated from the sample by the claimed distance (see paragraph 0021).

Yokogawa et al. does not expressly disclose a main control means, but Collins et al. '784 disclose an apparatus in which a controller 86 is used to automate the plasma apparatus. In view of this disclosure, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Yokogawa et al. as to further comprise the claimed control system of Collins et al. '784 because this allows for precise control of the desired apparatus and/or process parameters.

With respect to the diameter of the parallel plate, the Yokogawa et al. reference at paragraph 0017, discloses that it varies depending on the resonance

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mode of the electromagnetic wave. Also, in paragraph 0017, the reference discloses that the electromagnetic wave to generate the plasma has a frequency ranging from 300-500 MHz and that the electromagnetic field that is generated satisfies the ECR condition, the use of means 116 for generating electromagnetic wave of 300 kHz frequency onto the planar plate, the use of means 114 for controlling the temperature of the parallel plate, and the claimed surface material of the parallel plate of claims 10 and 26-27. With respect to claim 22, the limitations are disclosed in figure 2 and its description. With respect to the electromagnetic wave characteristics of claims 21 and 32, it would have been obvious to one having ordinary skill in the art at the time the invention was made that such characteristics can be achieved by controlling the parameters governing the electromagnetic wave and ECR conditions.

Furthermore, Yokogawa et al., and Collins et al. '784 do not expressly disclose means for controlling the temperature of the ring-shaped member disposed below a surface of the ring-shaped member. Toshihisa et al. discloses a plasma etching system including a ring-shaped member 6 disposed in a periphery of the sample, and means 19 for controlling the temperature of the ring-shaped member (to 100 °C) disposed below a surface of the ring-shaped member (see abstract, figs. 1-2 and paragraphs 0006-0010 of the machine translation). Collins et al. '013, also discloses a plasma system including a ring-shaped member 1050 disposed in a periphery of the sample, and means 2170/2175 for controlling the temperature of the ring-shaped member disposed below a surface of the ring-shaped member (see, for example, fig. 48A and col.

32, lines 55-60). Collins et al. '512, also discloses a plasma system including a ring-shaped member 62 disposed in a periphery of the sample, and means 77 for controlling the temperature of the ring-shaped member disposed below a surface of the ring-shaped member (see, for example, fig. 4A and col. 12-line 40 to col. 13-line 8). Therefore, in view of these disclosures, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Yokogawa et al. modified by Collins et al. '784 as to further comprise means for controlling the temperature of the ring-shaped member as disclosed by Toshihisa et al., Collins et al. '013, and Collins et al. '512 in order to eliminate temperature fluctuation of the ring-shaped member thereby improving precise control and reproduction characteristics of the plasma treatment, in order to prevent accumulation of material on the surfaces of the ring-shaped member, and/or in order to maintain the ring-shaped member at a sufficient temperature to ensure its favorable participation in the plasma process.

With respect to the specific temperature range of the ring-shaped member, note that one of the above references disclose maintaining the ring-shaped member within the desired range. Furthermore, such limitation is directed to a method limitation instead of an apparatus limitation, and since an apparatus is being claimed as the instant invention, the method teachings are not considered to be the matter at hand since a variety of methods can be done with the apparatus. The method limitations are viewed as intended uses which do not further limit, and therefore do not patentably distinguish the claimed invention. The apparatus of Yokogawa et al. modified by Collins et al. '784 and Toshihisa et

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al., Collins et al. '013 or Collins et al. '512 are capable of controlling the temperature of the ring-shaped member within the claimed range of temperature.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yokogawa et al., JP 9-321031 (machine translation) in view of Collins et al., U.S. Patent 6,068,784 and further in view of Toshihisa et al., JP 07-310187, Collins et al., U.S. Patent 6,054,013, or Collins et al., U.S. Patent 6,074,512, as applied to claims 1-8, 10-12, 14, 17-19, 21-29, 31-34, 36, 50-53, 55, and 58-65 above, and further in view of Gupta et al., U.S. Patent 5,902,494.

Yokogawa et al., Collins et al. '784, Toshihisa et al, Collins et al. '013, and Collins et al. '512 are applied as above but fail to expressly disclose a planar plate including a plurality of holes through which the material gas is supplied. Gupta et al. discloses a plasma apparatus in which the planar plate 11, to which mixed frequency can be supplied, is a gas manifold through which the gas is introduced to the processing chamber (see figure 1 and col. 4, lines 29-34). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Yokowaga et al. modified by Collins et al. '784, and Toshihisa et al, Collins et al. '013, or Collins et al. '512 by introducing the gas material through holes in the planar plates as disclosed by Gupta et al. because such gas inlet configuration is well known and used in the art and suitable for the intended purpose of uniformly dispersing the gas material to the chamber.

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Claims 15-16, 20, 56-57 and 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yokogawa et al., JP 9-321031 (machine translation) in view of Collins et al., U.S. Patent 6,068,784 and further in view of Toshihisa et al., JP 07-310187, Collins et al., U.S. Patent 6,054,013, or Collins et al., U.S. Patent 6,074,512, as applied to claims 1-8, 10-12, 14, 17-19, 21-29, 31-34, 36, 50-53, 55, and 58-65 above, and further in view of Kaji et al., EP 0793254 A2.

Yokogawa et al., Collins et al. '784, Toshihisa et al, Collins et al. '013, and Collins et al. '512 do not expressly disclose the claimed ring-shaped member that has electrical power supplied thereto. Kaji et al. discloses a ring-shaped member 37A through which high frequency power is supplied through a high frequency power source 17A (see fig. 14 and page 15-line 9 to page 16-line 11). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Yokogawa et al. modified by Collins et al. '784 and Toshihisa et al, Collins et al. '013, or Collins et al. '512 so as to include the ring-shaped member of Kaji et al. because this allows for an increased plasma density (see page 15, lines 16-27) which provides better process results within the apparatus.

Response to Arguments

Applicant's arguments with respect to claims 1-12, 14-29, 31-34, 36 and 50-53, 55-66 have been considered but are moot in view of the new ground(s) of rejection.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luz L. Alejandro whose telephone number is 703-305-4545. The examiner can normally be reached on Monday to Thursday from 7:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory L. Mills can be reached on 703-308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



Luz L. Alejandro
Patent Examiner
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March 23, 2003